

The

May 2003

Ballarat Naturalist



Habitat Changes as a Result of Fire

Speaker: Dr. Kevin Tolhurst

In 1984 Kevin took up a newly created position in fire research at the Creswick Forestry School. He established 5 research plots in the Wombat State Forest to study the effects of repeated spring and autumn fuel reduction burning at three and ten year intervals on

- the flora, fauna and soils;
- the functional processes of dry sclerophyll forest ecosystems;
- the short term and long term stability of such ecosystems.

Each plot is dominated by a candlebark *E. rubida*/Messmate *E. obliqua*/Narrow-leaf Peppermint *E. dives* association. Some plots are north of the Divide, some to the south. All have been divided into 5 sections: one has been left unburnt (since the 1935 fire) as a control, two have been burnt in spring, one at 3 year intervals and one at 10 year intervals, while the remaining two were burnt at the same intervals but in autumn. Each plot has a weather station since weather is a major driver of ecosystems—even a 2°-3° difference in temperature can evoke a significant difference in response. Tiny pitfall traps have been located in each to study invertebrates.

The understorey at each plot consists of wire-grass and bracken which forms 45% of this layer; poa 4%, herbs 3%, rushes 2%, and sedges and ferns. The changes in the understorey form the major part of the study, and to illustrate how dynamic this layer is, Kevin showed us a sequence of shots taken at regular intervals from the same point near Eaton's Dam after the 1977 fire. The changes in understorey structure, canopy shape and cover, and tree bark over a long period were dramatic.

In his study of unburnt plots from 1985-1998 he found that the amount of bracken could vary four-fold from year to year; dry spells affected amount of cover and size

of plants. Since 1985 there had been a 15% increase in understorey, with bracken and wiregrass a major part of that; herbs, trees and legumes had decreased while shrubs had increased. Changes could be related to recovery after the 1982-3 dry spell, recovery after thinning, and the stand's development from age 80 to 100.

After spring burns, vegetation sprouted rapidly at first, then slowed, recovering after 4 years but with continued burning each recovery was less significant and started from a lower base than the first one. The regenerative reserves of the plants are depleted under this regime. Autumn burns resulted in less cumulative effect but recovery was slower as sprouting didn't occur till spring.

Bracken recovered 6-fold in spring but less in autumn; grass and herbs responded similarly. So the conclusion was that occasional spring burning was good.

Major conclusions were:

- There's a progressively greater effect of repeated frequent burns due to incomplete recovery of plants between burns, and the impact of seasonal and fire intensity conditions. Frequent autumn burning only favoured herbs: it disadvantaged bracken, wire grass, poa, rushes, legumes and shrubs.
- The effect of a single fire cannot be extrapolated to successive burns.
- With regard to species composition, none were lost or gained, but a third showed a reduction in abundance, a third gained in abundance and a third showed no change. "Rarity" appeared to be a common phenomenon: a third occurred in only one plot, while one third occurred in all plots.
- Finally: Small changes have great significance over time. Along unburnt site is not in a "steady state", so there is no ideal fire regime. A variable fire regime gives rise to the greatest biodiversity. Long term fire ecology studies are necessary to discern changes too subtle to be picked up in the short term.

Excursion: Blakeville Fire Research Plot, Wombat State Forest

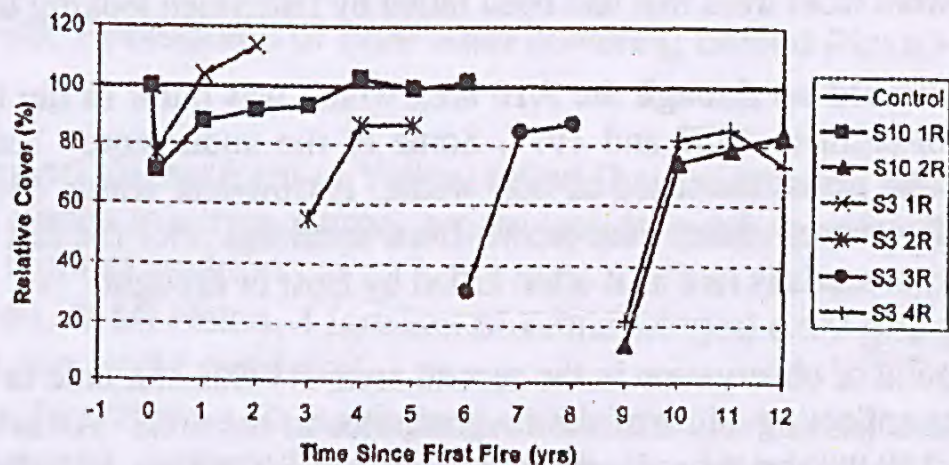
Leader: Dr. Kevin Tolhurst

Nearly thirty members of the club and visitors took the opportunity of pleasant weather to walk in the bush and see the fire research plots. The drive to the arranged location took many of us through some picturesque country-side near Ballan and through Blakeville. For details of the research please refer to the lecture he delivered at the Friday night meeting and to the notes which Dr. Kevin Tolhurst distributed at

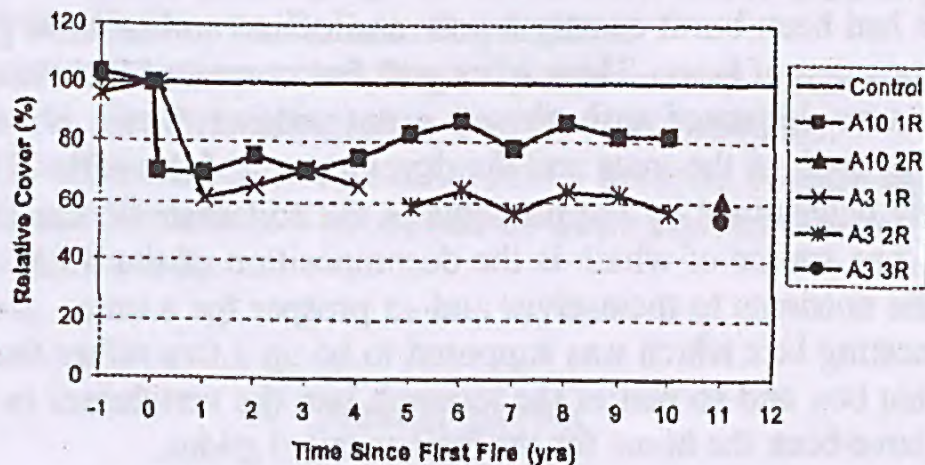
the excursion. This report here is a description of some of our day with Kevin at the plot on the Bunding-Blakeville Road.

Our first observation was of the volcanic bedrock near the Werribee River which was the product of a tongue of lava, possibly from Leonard's Hill. The bedrock of the research plots was of the same origin as the rocks of the Ballarat East goldfields which was mainly sandstone with occasional quartz veins. We were invited to view later some evidence of gold mining which was a deep tunnel into the bank of the river.

Total understorey cover—spring burning



Total understorey cover—autumn burning



During the couple of hours we viewed the effects of fire in three treatment plots and a control area. The areas are marked on the detailed map of the Blakeville area in the notes as A10, A3 S3 and C. A refers to Autumn, S refers to Spring and the number refers to the frequency of the burnings. The trees of the area were mainly mess-mate stringybark (*E. obliqua*), candlebark (*E. rubida*) and both broad-leaf and narrow-leaf peppermint (*E. radiata* and *dives*). The under-storey vegetation consisted of bracken fern and wire-grass with some small acacia, shrubs and herbs. Because of the drought there was not much of this vegetation to be seen.

The process of treatment burning consisted of choosing a day of light wind. Breaks were burnt around the area and point ignitions were made near the top of the area. The fires slowly burn down the slopes. The uphill side of the trees showed fire scars because of the extra heat it experienced there. The scars were often overlying earlier ones. The depth of the damage to the bark also depended on the heat with sometimes up to ten years of bark destroyed. Places near discontinuities such as fallen logs were left unburnt. These patches were important for the preservation of creatures, both invertebrates and vertebrates, as they were a place of refuge as well as a source from which the area could be again populated after a burning. One interesting stump was a very large one of a tree that was probably about 400 years old. Fallen logs that were a sad sight were from trees that had been felled by fishermen looking for grubs for bait.

First we climbed up through the A10 area which was burnt in the big fires of 1935, and control-burnt in 1987 and 1997. Some of the under-storey besides the bracken fern and wire grass, consisted of hop wattle, narrow-leaf wattle (*Acacia mucronata*) which had suckered rather than grown from seedlings after the last burning. *Acacia* growing from seeds is rare as it is often killed by frost or drought.

The first point of observation in the second area, A3 was of a hole in the ground. This is used for collecting some of the invertebrates in the area. An amazing number of creatures, 120,000 have been collected overall in the project including 100 species of beetle.

The S3 area had been burnt exactly a year earlier and so had little ground cover and little decomposition of litter. These trees give four tonnes of litter/hectare/year. Some of the trees were decorated with ribbons – not yellow! These ribbons were used to measure the growth of the trees and the development of the bark. The growth of the trees is partly determined by the nutrients in the soil such as calcium, nitrogen and phosphorus, one source of which is the decomposition of the litter. After a burn the trees have the nutrients to themselves and so prosper for a time. Another interesting find was a nesting box which was supposed to be up a tree rather than on the ground. This was a bat box and so part of the research into the vertebrates in the area. Sometimes these have been the home for the feather-tailed glider.

The control area differed in appearance from the treatment areas in that the ground was covered in many more twigs in the old litter, the wattles were 15-20 years old, there were more small trees about and of course the bark of the trees was not black.

The day was not one for viewing birds. Magpies were heard

Fran Hanrahan.

April Meeting Points

- 36 members and visitors were welcomed.
- Urban Stormwater seminar: Fran Hanrahan attended the seminar and received educational materials suitable for schools
- Working bee is being planned to clear weeds on Field Nats Island, North Gardens Wetland. Members indicated a slight balance in favour of a week day. Committee to liase with Kurtis Noyce and arrange a date.
- Castlemaine FNC CD "Is it a Weed?" available for \$5.

Show and Tell.

- Lyndsay Fink: Photograph of Blue Gum flowering behind Pizza Hut.

Field Reports

- Belinda Taylor: Yellow form of Yellow-tailed Black Cockatoo which only had black bands in wings. Large, cream tree frog 1.5 m up in *Baeckea virgata* at night at Haddon.
- John Mildren: At Mt Helen, 4 families of White-winged Choughs totalling 36 birds. Little Eagle overhead.
- Greg Binns: In crater on Mt Buninyong, Wanderer (Monarch) butterfly. Grey Currawong, Eastern Spinebill and Grey Fantail in central Ballarat garden.
- Gail Whyte: Grey-headed Flying Foxes have moved to Geelong Botanic Gardens from Melbourne Botanic Gardens.
- Ken Hammond: 5 Yellow-tailed Black Cockatoos and Australian Hobby at Sebastopol. Eastern Spinebill in Correa at Wendouree.
- Carol Hall: On Flinders Island, 2 adult and 1 juvenile Wedge-tailed Eagle landed within 100 metres. Thousands of Cape Barren Geese. Also Wild Turkeys and Peacock.

A Coastal Break

We waited for cooler weather before taking a desired break at the coast. We watched the weather maps to improve our chances of the cooler weather, looking for the southerly shift of the anticyclones from the Indian Ocean as they travelled eastwards. The latitude of these anticyclones dictates much of the weather in southern Victoria. The further south the anticyclones travel the cooler and wetter our climate becomes as the winds come up from the south.

When appropriate we took a punt and went to the coast for a few days. Slowly we rehydrated, metaphorically speaking, after enduring months of sunshine and drying winds. One of the places we visited frequently was a wetland, now known as the

Alan Noble Reserve, in Airey's Inlet. This reserve appears to be a natural wetland, probably formed as a result of dune activity and silting of the Painkalac Creek estuary.

The swamp carries a variety of vegetation with open areas of water (very little at the time of this visit). Our casual observations gave us sight of more than twenty species of birds. The highlights were Purple Swampheens and Dusky Moorhens with juveniles, Black-tailed Native Hens, Shining Bronze Cuckoo, Singing Honeyeater and a Nan-keen Night Heron flushed from the reeds by a Great Egret.

Ken and Del McDonnell.

From the Media.....Another view on global warming.

The global warming debate took another turn with scientists from Harvard University claiming the climate in the Middle Ages was actually warmer than it is today. Britain's *Daily Telegraph* reported that the team studied "temperature proxies" including tree rings, ice cores and historical accounts, reaching the conclusion—to be published in the journal *Energy and Environment*—that it was hotter during the period 900 to 1300AD (give or take a few years) than now.

The Medieval Warm Period was brought to an end by the onset of the whimsically named Little Ice Age. They said current temperature rises looked more dramatic than they actually were because the changes were measured over too short a period of time, and that records used by scientists dated from a relatively cold patch in the Earth's recent history. But dissenting voices said the Harvard team's conclusion that 20th century warming was not unusual relied on the assertion that the Medieval Warm Period was a global phenomenon.

The Weekend Australian April 19-20 2003.

Editor's comment: Does this tie in with the ability of the Norse seafarers to settle in southern Greenland during this warmer period when crops could be grown, only to have the settlements fail due to worsening climate, the consequent conflict with Inuit peoples living on whales, seals and fish moving south, and the failure of the home country (Norway) to help them? These Norse peoples were used to cropping and grazing livestock and never adapted to the more sustainable hunter-gatherer economy of the Inuit.

In Britain the Little Ice Age of the 14-17th centuries resulted in, among other things, the River Thames freezing over in winter when fairs were held on the ice!

Rocky Resident faces Extinction

The following is taken from an article by Trevor Pescott in a recent copy of the *Gee-long Advertiser*.

The Stony Rises of the Western District of Victoria are home to a quite remarkable little reptile. Known as the Corangamite water skink, it lives in the rock stacks around the shores of many of the lakes. Sadly it is in danger of extinction, partly from the effects of the drought but more seriously from the removal of rocks for fences, and landscaping in suburban gardens. Predation by cats and cattle grazing along the shoreline of the lakes are other serious hazards.

First discovered near Lismore in 1963, it was not until a review of the water skink genus was undertaken in 1995 that it was assigned its formal or scientific name. Now it is known as *Eulamprus tympanum marnieae*, or more informally as the Corangamite water skink.

Its living quarters are not chosen at random. The skink needs access to permanent fresh water, stacks of deeply fissured rocks where it can escape extreme heat, and scattered shade offered by small shrubs, particularly tree violets. This combination of features is found in many parts of the Stony Rises, but little of it is in public land reserves, so its conservation depends largely on the goodwill of landowners. As is usually the case, this is almost invariably given when the reason is outlined.



However, we have known about the skink for only a short time, and many of the sites where it lived were used for agriculture long before their significance was realised.

The skink has now small populations that are isolated and fragmented, so it will take a great deal of active management, as well as passive protection, if it is going to survive.

Corangamite skinks give birth to from one to five live young in late summer. The lizards mate in autumn, but the female stores the sperm until spring when she produces eggs which are then fertilised. The eggs are held in her body until the embryos are fully formed, and the young are then born. The skinks, which are only about 20cm long, are relatively long-lived, a life-span of about 15 years being not unusual. The relatively small family size reflects this longevity, but it has a particular relevance to conservation. If a population is decimated from some event such as drought, it takes a much longer time to re-build.

Calendar

May

- Fri. 2 Meeting: Ern Perkins: *Box-Ironbark Forests*.
Sun. 4 Excursion: *Exploring the Box-Ironbark Forest* with Ern Perkins.

June

- Mon. 2 Committee Meeting @ John Gregurke's, 7.30pm.
Fri. 6 Meeting: Members' Presentations: *Land for Wildlife/ANN Camp-out*.
Sun. 8 Excursion: *Ballarat Bird Park* - half day.

Supper Duty:

May: Trish Hughes & Maureen Hazelton

Committee

President Mrs. Carol Hall
Vice-President Mr. Greg Binns
Secretary Mr. John Gregurke
Treasurer Mr. Bob Curtain

Miss Helen Burgess.....
Miss Maureen Christie.....
Mrs. Claire Dalman.....
Mrs. Carol Hall (Editor)....

Miss Fran Hanrahan.....
Mr. Les Hanrahan.....
Mrs. Kay Preston.....

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Editor:

Website: www.ballarat.yourguide.com.au Click on *Local Info*. Search *Environment*.

Meetings are held at the Ballarat Horticultural Centre, cnr. Gregory & Gillies Sts (VicRoads 254 F8) on the first Friday of the month at 7.30pm.

Excursions: Depart from Ballarat Market Place (formerly Creswick Plaza) Creswick Rd., Ballarat (VicRoads 255 M10) at 9.30 am unless otherwise specified.

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